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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/664,747
Filing Date: September 18, 2003
Appellant(s): KEENE ET AL.

Kendall E. Keene et. al.
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 2/29/08 appealing from the Office action mailed 1/19/07.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

WITHDRAWN REJECTIONS

The following grounds of rejection are not presented for review on appeal because they have been withdrawn by the examiner. The 112 second paragraph rejection in Paragraphs 3-4 in the Office Action Mailed on 1/19/07 is withdrawn.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

4553759	Kilmoyer	11-1985
4496162	McEver et al	1-1985
4,381,114	Vanderford, Jr.	4-1983
3,869,132	Taylor et. al.	3-1975

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. Claim 19 and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Kilmoyer (US. 4,553,759).

Kilmoyer discloses a seal for closing off an annular space between a first and second body and supported by at least one of the first and second bodies (intended use). The seal assembly having an annularly shaded body (72) having an upper (end near 82) and a lower end (end 74) and a longitudinal axis, the body comprises at least one first ring in a first groove (ring 80 in groove 86), the circumference of the first ring differs from the circumference of the first groove (the circumference of ring 80 differs then the circumference of the groove 86) so at to apply a net radial force to the body in a direction substantially perpendicular to the longitudinal axis and the circumference of the first ring is greater than the circumference of the groove (the ring 80 has a circumference that is greater than the circumference of the groove as seen in figure 3).

The body comprises a second ring (78) in a second groove (84) disposed on the opposite of the body from the first ring, the second ring, when the body is installed in the annular gap (intended use), is in an interference fit with the one of the first and second bodies to an extend of at least a portion of the cross-sectional diameter of the second ring. The first and second rings are made of virgin PTFE which has Durometer hardness of about 56-85 (this material has a Durometer hardness of 40-65, evidence of this is showed by Czernik et al, US. 3,924,907).

The circumference of the first ring at location nearest the first circumference of the first groove differs from the first circumference of the first groove (the circumference of the first ring is different that the circumference of the groove circumference).

The first ring is softer than the body.

The limitation that the first circumference of the first ring at a location nearest the first circumference of the first groove differs before mounting is not persuasive because this is considered to be a method limitation. Furthermore the first ring 46 has a circumference that is contracted to an amount so as to be placed in a groove 56.

The seal of Kilmoyer is capable of being placed in a gap between two components and that the gap is smaller than the seal, so as to contract the seal.

Claim Rejections - 35 USC § 103

2. Claims 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kilmoyer.

Kilmoyer discloses the claimed invention except that the first ring circumference is 8-15% different from the first groove in which it is installed. Discovering an optimum range of a result effective variable involves only routine skill in the art. In re Kulling, 895 F.2d 1147, 14 USPQ 2d 1056. Without the showing of some unexpected result. Since applicant has not shown

some unexpected result the inclusion of this limitation is considered to be a matter of choice in design. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the first ring circumference is 8-15% different than the circumference of the first groove in which it is installed as a matter of design choice.

Regarding to the limitations "when the body is installed in the annular gap, is in an interference fit with the one of the first and second bodies to an extend of at least about 20% of the cross-sectional diameter of the second ring" is considered to be intended use and the second ring of Kilmoyer is capable of being in an interference fit of 20% with respect with another body.

3. Claim 5-8, 12-16 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over McEver et al (US. 4,496,162) in view of Vanderford et al (US. 4,381,114) and further in view of Kilmoyer (Us. 4,553,759).

McEver discloses a seal for closing off an annular space between first and second bodies (inner body 18 and outer body having surface 12) and supported by at least one of the first and second bodies (intended use). The seal assembly comprising an annular shaped body (36) having an upper and a lower end (upper and lower end of 36 having backup rings 50 and 52), at least one backup ring (backup rings 50 and 52) mounted on the ends of the annular shaped body and having a relaxed dimension greater than the annular space (the body and the backup ring have a greater dimension than an annular space because backup rings 50, 52 and body 36 contact the bodies) between the first and second bodies so that opposed ends on the backup ring must be compressed to be inserted in the annular gap (the body and the backup rings are compressed). The backup rings having ends that extend toward each other (body backup rings 50 and 52 have ends 56a and 56b that extend toward each other). The body urges the ends of the backup rings

away from each other (this is the case since the body 36 is between ends 56a and 56b). The backup rings are placed between the bodies and the backup rings apply a force to the bodies. The annular shaped body has an interference fit with the bodies. The annular shaped body having an inner circumferential surface that contacts a first body and an outer circumferential surface that contacts a second body (inner body 18 and outer body having surface 12).

The limitation that the backing ring must be compressed to be inserted in the annular gap is considered to be method limitation and is given little patentable weight. Furthermore the seal of McEver is capable of being inserted after the two members 18 and 22 are brought sufficiently together.

McEver discloses the invention substantially as claimed above but fails to disclose that the backup ring further comprising a bend between the ends of the backup ring. Vanderford discloses a seal body having ends and the ends having backup rings with ends (figure 4, seal 64' having ends with backup rings having ends 86', 84', 90' and 92') and a seal body having ends (fig. 5, 100), the ends of the seal having backup rings having ends (fig. 5, backup rings having ends 110 and 107) and a bend (112) between the ends of the backup rings (fig.5, 112 is between the ends of the backup rings). It would have been obvious to one having ordinary skill in the art at the time the invention was made to configure the backup rings of McEver to have a bend between the ends of the backup rings as taught by Vanderford, to provide additional strength (column 3, lines 67-68 of Vanderford).

Regarding the limitations that the bend between the opposed ends **to store a force created by insertion of the backup ring into the annular space and apply the force on the opposed ends against the first and second bodies is given little patentable weight, since this**

limitations are considered to be method limitation. Furthermore McEver teaches the structural limitations of having a bend between opposed ends of a backup ring.

McEver and Vanderford disclose the invention substantially as claimed above but fail to disclose that the body comprises at least one first ring in a first groove, the groove having a bottom and a circumference at the bottom, the circumference of the first ring at a location nearest the first circumference of the first groove differs before mounting from the first circumference of the first groove, a second ring in a second groove and the circumference of the second ring is shorter than the circumference of the second groove. Kilmoyer discloses a seal ring having a first groove (56), the first groove having a ring (48), a second groove (58) having a second ring (46), the circumference (outer circumference of the first ring 48) of the first ring exceeds the circumference of the first groove (the circumference of a bottom of the first groove and furthermore the first ring projects beyond the groove depth), the circumference of the second ring (inner circumference of the second ring) is shorter than the circumference of the second groove (the circumference of a bottom of the second groove and furthermore the ring projects beyond the groove depth), the rings are made of virgin PTFE (this material has a Durometer hardness of 40-65, evidence of this is showed by Czernik et al, US. 3,924,907), the first ring contacts a first body (22) and the second ring contacts a second body (26). The circumference of the first ring at location nearest the first circumference of the first groove differs from the first circumference of the first groove (the circumference of the first ring is different that the circumference of the groove circumference). It would have been obvious to one having ordinary skill in the art at the time the invention was made to configure the annular body of McEver and Vanderford to have first and second grooves to have first and a second rings, the circumference

of the first ring exceeds the circumference of the first groove, the circumference of the second ring is shorter than the circumference of the second groove, the rings are made of virgin PTFE and the rings contact the bodies as taught by Kilmoyer to provide a seal at low temperatures (column 3, lines 15-16 of Kilmoyer).

The limitation that the first circumference of the first ring at a location nearest the first circumference of the first groove differs before mounting is not persuasive because this is considered to be a method limitation. Furthermore Kilmoyer teaches that the first ring 46 has a circumference that is contracted to an amount so as to be placed in a groove 56 (see figure 2).

Regarding claims 6 and 16: The first ring when placed in contact with on of the first and second bodies deforms in a manner so as to force the ends of the backup ring away from each other, the body has a longitudinal axis and the deformation results in the first deforming into an undulating wave pattern in an axial direction parallel to the longitudinal axis (this limitation is considered to be intended use and/or method limitations which is given little patentable weight in an apparatus claim, when something is placed into something else to cause a reaction).

Regarding claims 12-13: The first ring is the second ring of Kilmoyer because the first ring has a shorter circumference than the groove and contacts with one of the bodies that has larger dimension. Furthermore when the body is installed in the annular gap, is in an interference fit with the one of the first and second bodies to an extend of at least about 20% of the cross-sectional diameter of the first ring (this is considered to be intended use and further more see paragraph that rejects claim 14).

Regarding claim 16: This is rejected because all the structural limitations are disclosed by McEver, Vanderford and Kilmoyer. The wave pattern in the axial direction is caused by the

circumferential dimension of the first ring relative to the circumferential dimension of the first groove, which is taught by Kilmoyer.

Regarding claim 7: McEver, Vanderford and Kilmoyer disclose the claimed invention except that the first ring circumference is 8-15% greater than the circumference of the first groove in which it is installed. Discovering an optimum range of a result effective variable involves only routine skill in the art. In re Kulling, 895 F.2d 1147, 14 USPQ 2d 1056. Without the showing of some unexpected result. Since applicant has not shown some unexpected result the inclusion of this limitation is considered to be a matter of choice in design. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the first ring circumference be in the range of 8-15% greater than the circumference of the first groove in which it is installed as a matter of design choice.

Regarding claims 14-15: McEver, Vanderford and Kilmoyer disclose the claimed invention except that the second ring is in an interference fit with one of the bodies to an extend of about 20% of the cross-section diameter of the second ring (meaning that 20% of the diameter is contacting the body). Discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Without the showing of some unexpected result. Since applicant has not shown some unexpected result the inclusion of this limitation is considered to be a matter of choice in design. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the second ring in an interference fit with one of the bodies to an extend of about 20% of the cross-section diameter of the second ring as a matter of design choice. Furthermore this is considered to be a method limitations and given little patentable weight in an apparatus claim.

4. Claims 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over McEver in view of Kilmoyer.

McEver discloses a seal assembly for closing off an annular space between first and second bodies (inner body 18 and outer body having surface 12) and supported by at least one of the first and second bodies (intended use). The seal assembly comprising an annular shaped body (36) having an upper and a lower end (upper and lower end of 36 having backup rings 50 and 52), at least one backup ring (backup rings 50 and 52) mounted on the ends of the annular shaped body and having a relaxed dimension greater than the annular space (the body and the backup ring have a greater dimension than an annular space because backup rings 50, 52 and body 36 contact the bodies) between the first and second bodies so that opposed ends on the backup ring must be compressed to be inserted in the annular gap (the body and the backup rings are compressed). The backup rings having ends that extend toward each other (body backup rings 50 and 52 have ends 56a and 56b that loop toward each other). The body urges the ends of the backup rings away from each other (this is the case since the body 36 is between ends 56a and 56b). The backup rings are placed between the bodies and the backup rings apply a force to the bodies. The annular shaped body has an interference fit with the bodies. The annular shaped body having an inner circumferential surface that contacts a first body and an outer circumferential surface that contacts a second body (inner body 18 and outer body having surface 12).

McEver disclose the invention substantially as claimed above but fail to disclose that the body comprises at least one first ring in a first groove, the first groove having a bottom and a first circumference at the bottom, the circumference of the first ring at a location nearest the first

circumference of the first groove differs from mounting from the first circumference of the first groove, a second ring in a second groove and the circumference of the second ring is shorter than the circumference of the second groove. Kilmoyer discloses a seal ring having a first groove (56), the first groove having a ring (48), a second groove (58) having a second ring (46), the circumference (outer circumference of the first ring 48) of the first ring exceeds the circumference of the first groove (the circumference of a bottom of the first groove and furthermore the first ring projects beyond the groove depth), the circumference of the second ring (inner circumference of the second ring) is shorter than the circumference of the second groove (the circumference of a bottom of the second groove and furthermore the ring projects beyond the groove depth), the rings are made of virgin PTFE (this material has a Durometer hardness of 40-65, evidence of this is showed by Czernik et al, US. 3,924,907), the first ring contacts a first body (22) and the second ring contacts a second body (26). The circumference of the first ring at location nearest the first circumference of the first groove differs from the first circumference of the first groove (the circumference of the first ring is different that the circumference of the groove circumference). It would have been obvious to one having ordinary skill in the art at the time the invention was made to configure the annular body of McEver to have first and second grooves to have first and a second rings, the circumference of the first ring exceeds the circumference of the first groove, the circumference of the second ring is shorter than the circumference of the second groove, the rings are made of virgin PTFE and the rings contact the bodies as taught by Kilmoyer to provide a seal at low temperatures (column 3, lines 15-16 of Kilmoyer).

The limitation that the first circumference of the first ring at a location nearest the first circumference of the first groove differs before mounting is not persuasive because this is considered to be a method limitation. Furthermore Kilmoyer teaches that the first ring 46 has a circumference that is contracted to an amount so as to be placed in a groove 56 (see figure 2).

Regarding to the limitations "when the body is installed in the annular gap, is in an interference fit with the one of the first and second bodies to an extend of at least about 20% of the cross-sectional diameter of the second ring" is considered to be intended use and the seal assembly of McEver et al and Kilmoyer is capable of being in an interference fit of 20% with respect with another body.

5. Claims 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over McEver and Kilmoyer as applied to claim 22 above, and further in view of Vanderford.

McEver and Kilmoyer disclose the invention substantially as claimed above but fail to disclose that the backup rings further comprising a bend between the ends of the backup rings to store a force. Vanderford discloses a seal body having ends and the ends having backup rings with ends (figure 4, seal 64' having ends with backup rings having ends 86', 84', 90' and 92') and a seal body having ends (fig. 5, 100), the ends of the seal having backup rings having ends (fig. 5, backup rings having ends 110 and 107) and a bend (112) between the ends of the backup rings (fig.5, 112 is between the ends of the backup rings). It would have been obvious to one having ordinary skill in the art at the time the invention was made to configure the backup rings of McEver to have a bend between the ends of the backup rings as taught by Vanderford, to provide additional strength (column 3, lines 67-68 of Vanderford).

Regarding claims 24-25: These claims are rejected because all the structural limitations are disclosed by McEver, Vanderford and Kilmoyer. The wave pattern in the axial direction is caused by the circumferential dimension of the first ring relative to the circumferential dimension of the groove. The first ring when placed in contact with on of the first and second bodies deforms in a manner so as to force the ends of the backup ring away from each other, the body has a longitudinal axis and the deformation results in the first deforming into an undulating wave pattern in an axial direction parallel to the longitudinal axis (intended use, when something is placed into something else to cause a reaction).

6. Claim 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over McEver et al (US. 4,496,162) in view of Vanderford et al (US. 4,381,114) in further view of Taylor (US. 3,869,132) and further in view of Kilmoyer (Us. 4,553,759).

McEver discloses a seal assembly for closing off an annular space between first and second bodies (inner body 18 and outer body having surface 12) and supported by at least one of the first and second bodies (intended use). The seal assembly comprising an annular shaped body (36) having an upper and a lower end (upper and lower end of 36 having backup rings 50 and 52), at least one backup ring (backup rings 50 and 52) mounted on the ends of the annular shaped body and having a relaxed dimension greater than the annular space (the body and the backup ring have a greater dimension than an annular space because backup rings 50, 52 and body 36 contact the bodies) between the first and second bodies so that opposed ends on the backup ring must be compressed to be inserted in the annular gap (the body and the backup rings are compressed). The backup rings having ends that extend toward each other (body backup rings 50 and 52 have ends 56a and 56b that extend toward each other). The body urges the ends

of the backup rings away from each other (this is the case since the body 36 is between ends 56a and 56b). The backup rings are placed between the bodies and the backup rings apply a force to the bodies. The annular shaped body has an interference fit with the bodies. The annular shaped body having an inner circumferential surface that contacts a first body and an outer circumferential surface that contacts a second body (inner body 18 and outer body having surface 12).

The limitation that the backing ring must be compressed to be inserted in the annular gap is considered to be method limitation and is given little patentable weight. Furthermore the seal of McEver is capable of being inserted after the two members 18 and 22 are brought sufficiently together.

McEver discloses the invention substantially as claimed above but fails to disclose that the backup ring further comprising a bend between the ends to store a force. Vanderford discloses a seal body having ends and the ends having backup rings with ends (figure 4, seal 64' having ends with backup rings having ends 86', 84', 90' and 92') and a seal body having ends (fig. 5, 100), the ends of the seal having backup rings having ends (fig. 5, backup rings having ends 110 and 107) and a bend (112) between the ends of the backup rings (fig.5, 112 is between the ends of the backup rings). It would have been obvious to one having ordinary skill in the art at the time the invention was made to configure the backup rings of McEver to have a bend between the ends of the backup rings as taught by Vanderford, to provide additional strength (column 3, lines 67-68 of Vanderford).

McEver and Vanderford disclose the invention substantially as claimed above but fail to disclose that the ends of the backup ring loop toward each other to create a gripping engagement

with the body under residual force upon initial mounting to the body (intended use). Taylor teaches to use an E-shape member having ends that loop towards each other (figure 4) instead of a C or U or V shape ring (figures 2-3 and 5), which is placed on an annular body having an upper and lower end. It would have been obvious to one having ordinary skill in the art at the time the invention was made to configure the ends of the backup ring of McEver and Vanderford to have loop ends as taught by Taylor, to provide a more resilient backup ring and lowering the amount of force required to squeeze the backup ring (column 4, lines 1-6 of Taylor).

McEver, Vanderford and Taylor disclose the invention substantially as claimed above but fail to disclose that the body comprises at least one first ring in a first groove, the circumference of the first ring exceeds the circumference of the first groove and the first ring, when placed in contact with one of the first and second bodies, deforms in a manner so as to force the ends of the backup ring away from each other (when a ring is placed in a groove of the body of McEver and Vanderford would cause this because the ring will compress the annular body inwardly and this will cause the annular body to force the ends of the backup rings to move away from each other), a second ring in a second groove and the circumference of the second ring is shorter than the circumference of the second groove. The first ring at a location nearest the first circumference of the first groove differs from the first circumference of the first groove. Kilmoyer discloses a seal ring having a first groove (56), the first groove having a ring (48), a second groove (58) having a second ring (46), the circumference (outer circumference of the first ring 48) of the first ring exceeds the circumference of the first groove (the circumference of a bottom of the first groove and furthermore the first ring projects beyond the groove depth), the circumference of the second ring (inner circumference of the second ring) is shorter than the

circumference of the second groove (the circumference of a bottom of the second groove and furthermore the ring projects beyond the groove depth), the rings are made of virgin PTFE (this material has a Durometer hardness of 40-65, evidence of this is showed by Czernik et al, US. 3,924,907), the first ring contacts a first body (22) and the second ring contacts a second body (26). The circumference of the first ring at location nearest the first circumference of the first groove differs from the first circumference of the first groove (the circumference of the first ring is different that the circumference of the groove circumference). It would have been obvious to one having ordinary skill in the art at the time the invention was made to configure the annular body of McEver, Vanderford and Taylor to have first and second grooves to have first and a second rings, the circumference of the first ring exceeds the circumference of the first groove, the circumference of the second ring is shorter than the circumference of the second groove, the rings are made of virgin PTFE and the rings contact the bodies as taught by Kilmoyer to provide a seal at low temperatures (column 3, lines 15-16 of Kilmoyer).

The limitation that the first circumference of the first ring at a location nearest the first circumference of the first groove differs before mounting is not persuasive because this is considered to be a method limitation. Furthermore Kilmoyer teaches that the first ring 46 has a circumference that is contracted to an amount so as to be placed in a groove 56 (see figure 2).

Response to Arguments

7. Applicant's arguments filed 8/10/06 have been fully considered but they are not persuasive.

Applicants' arguments with regards to claims that are canceled are moot.

Applicants' arguments with regards to claims 5-8, 12-15, 20-26 are moot in view of the new rejection above.

Applicants' argument that Kilmoyer fails to disclose that the ring having a different circumference than the circumference of the groove is not persuasive because one in the ordinary skilled in the art is aware of that the ring 78 must be expanded to be placed in the groove 84 and the ring 80 must be expanded to be placed in the groove. Furthermore the ring 80 has an circumference near the bottom wall of groove 86 that is larger, since the ring goes over the groove. Similarly the ring 78 has a circumference that is smaller then the bottom of the groove 84, since the groove goes around the ring.

Applicants' argument that Kilmoyer does not teach "the circumference of the first ring at a location nearest the first circumference of the first groove differs from the first circumference of the first groove" is not persuasive because as stated before the reference of Kilmoyer does teach this. The seal ring 46 of Kilmoyer has an outer diameter that corresponds to the bottom surface of groove 56 that is contracted and placed on top of a bottom surface of the groove 56 to provide a contact with the groove bottom surface as seen in figure 2, so the limitation that the first ring at a location nearest the first circumference of the first groove differs before mounting from the first circumference of the groove is taught by Kilmoyer.

Applicants' argument that Kilmoyer cannot be combined with McEver is not persuasive because there is a clear teaching in Kilmoyer why one places grooves in a ring body and sealing members in the grooves to provide seal in low temperature environment.

Furthermore McEver teaches to have a seal ring that is compressed before it is placed in a place having backup rings. The backup ring having a bent between the ends of the backup ring

is taught by Vanderford. The loop ends are taught by Taylor. The reference of Kilmoyer teaches to have O-rings to be placed on grooves in the seal ring

(10) Response to Argument

Appellants' arguments filed 2/29/08 have been fully considered but they are not persuasive.

Response to arguments for 1st ground of rejection, claims 19 and 27 rejected as 102(b) by Kilmoyer:

Appellants' argument that Kilmoyer does not disclose a first ring and a first groove where the circumference of the first ring at a location nearest the bottom of the first groove differs before mounting so as to apply a net radial force to said body in a direction substantially perpendicular to said longitudinal axis is not persuasive because as stated in column 3, the ring 46 or 48 ensure a preload on the sealing lips. This is the reason that the rings must have a circumference that is different than the bottom of the first groove 56 or 58 to provide preload on the sealing lips. Furthermore the relaxing of the sealing lips at low temperature will cause the groove dimensions to change and not the dimension of the soft seal rings as implied in column 3, lines 10-22).

Appellants' statement that "the soft seal rings (e.g. 46 and 48 of Kilmoyer) are loosely in the groove prior to insertion of the load ring insertion" on page 14 last line, is acknowledge and provides support for the examiners that the circumferential dimension of the soft seal rings differs than the circumferential dimension the bottom of the first groove.

Appellants' argument that before mounting provides structural limitations because it describes a physical characteristic of the first ring is correct, but does not provide the physical

characteristic that the first ring disposed on the outer face of the seal assembly has a circumference smaller than the bottom of the first groove (if this was the physical characteristic implied than dependents claims 23-25 would not be further limiting).

Appellants' argument that the Kilmoyer focuses on a seal assembly that functions by a radial force applied outwardly from the annular seal body to the seal rings 46 and 48 resting therein is not persuasive because if one applies a radial outward force then the seal rings would counter act that radial outward force to provide radial inward force to the lips having the grooves 56 and 58.

Response to arguments for claim 27:

Appellants' arguments that the dependent claim 27 should be allowed due to Kilmoyer does not anticipate independent claim 19 is not persuasive in view of the arguments presented above. Furthermore Kilmoyer teaches that the seal rings 46 and 48 are softer than the annular shaped body (column 2, line 61, the seal ring is filled PTFE and column 3, lines 6, the inner and outer soft seal rings 46 and 48, of Kilmoyer).

Response to arguments for 2nd ground of rejection, claims 20-22 rejected as 103(a) by Kilmoyer:

Applicants' argument to claims 20-22 are not persuasive because Kilmoyer does teach the circumferential dimension of the seal ring and a circumferential dimension of the groove and choosing 8-15% circumferential compression would have been obvious, since appellants has not provide no criticality to this particular range but only a preferred value (See specification page 5, lines 5-6). Furthermore one can choose to place the seal in a space that would compress the seal assembly by 8-15%.

Response to arguments for claim 21:

In response to applicant's argument that configure to maintain a 20% interference fit once installed in an annular gap between two members, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

Response to arguments for 3rd ground of rejection, claims 5-8, 12-16 and 26 rejected as 103(a) by McEver, Vanderford Jr., and Kilmoyer:

Appellants' argument that McEver fails to disclose a bend between the opposed ends of the back-up ring is not persuasive because this is taught by Vanderford Jr. that the back-up rings have a concave or groove shape portion 112 as shown in dashed lines to provide additional strength to seal ring assembly 98 (column 3, lines 65-68 of Vanderford, Jr.). The examiner has provided motivation to provide a bend between the opposed ends of the back up ring.

Appellants' argument that the back up ring has a bend between the opposed ends to store a force by insertion of the backup ring into the annular space is not persuasive because Vanderford Jr. clearly teaches the structural limitation that stores the force (e.g. bend between the opposed ends of the back up ring).

Appellants' argument that McEver does not disclose the first ring and first groove circumferential relationship is correct but this is taught by Kilmoyer. Kilmoyer teaches to have a seal assembly to have grooves and rings placed in the grooves to provide seal at low temperatures. Kilmoyer states in column 3, the ring 46 or 48 ensure a preload on the sealing lips.

This is the reason that the rings must have a circumference that is different than the bottom of the first groove 56 or 58 to provide preload on the sealing lips.

Furthermore the relaxing of the sealing lips at low temperature will cause the groove dimensions to change and not the dimension of the soft seal rings as implied in column 3, lines 10-22).

Appellants' statement that "the soft seal rings (e.g. 46 and 48 of Kilmoyer) are loosely in the groove prior to insertion of the load ring insertion" on page 14 last line, is acknowledge and provides support for the examiners that the circumferential dimension of the soft seal rings differs than the circumferential dimension the bottom of the first groove.

Appellants' argument that Kilmoyer teaches away from is not persuasive because as stated in the rejection above one would choose to use the teaching of placing soft seal rings on groove of an annular shaped body to provide sealing at low temperatures.

In response to applicant's argument that the backup ring must be compressed to be inserted into an annular gap, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. Furthermore the back up ring of McEver is capable of being placed in a gap that is smaller than the radial dimension of the annular shaped body.

Response to arguments for claims 6 and 16:

In response to applicant's argument that when placed in contact with one of the first and second bodies deforms the first groove to force the ends of the backup ring away from each

other, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. This functional recitation is accomplished by having a bend between the opposed ends of the backup ring (See specification page 3, lines 20-23, "The ring 12 has a bend 22 that absorbs and stores a force as ends 16 and 18 are pushed into the interference fit of the annular space in which they are mounted. As a result, the ring 12 acts as a spring due to placement of bend 22.") and this structural limitations is taught by Vanderford Jr.

Response to arguments for claim 7:

Applicants' argument to claim 7 is not persuasive because Kilmoyer does teach the circumferential dimension of the seal ring and a circumferential dimension of the groove and choosing 8-15% circumferential compression would have been obvious, since appellants has not provide no criticality to this particular range but only a preferred value (See specification page 5, lines 5-6). Furthermore one can choose to place the seal in a space that would compress the seal assembly by 8-15%.

Response to arguments for claim 12:

In response to applicant's argument that configure to maintain a 20% interference fit once installed in an annular gap between two members, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

Response to arguments for claims 14 and 15:

Appellants' argument that since the rejection does not disclose all the limitations of claim 5, the claims 14 and 15 are also patentable is not persuasive because as stated above that claim 5 is rejected by McEver, Vanderford Jr. and Kilmoyer.

Response to arguments for claim 16:

Appellants' argument that since the rejection does not disclose all the limitations of claim 5, the claim 16 is also patentable is not persuasive because as stated above that claim 5 is rejected by McEver, Vanderford Jr. and Kilmoyer.

Response to arguments for 4th ground of rejection, claims 19-22 rejected as 103(a) by McEver and Kilmoyer:

Appellants' argument that McEver does not disclose the first ring and first groove circumferential relationship is correct but this is taught by Kilmoyer. Kilmoyer teaches to have a seal assembly to have grooves and rings placed in the grooves to provide seal at low temperatures. Kilmoyer states in column 3, the ring 46 or 48 ensure a preload on the sealing lips. This is the reason that the rings must have a circumference that is different than the bottom of the first groove 56 or 58 to provide preload on the sealing lips.

Furthermore the relaxing of the sealing lips at low temperature will cause the groove dimensions to change and not the dimension of the soft seal rings as implied in column 3, lines 10-22).

Appellants' statement that "the soft seal rings (e.g. 46 and 48 of Kilmoyer) are loosely in the groove prior to insertion of the load ring insertion" on page 14 last line, is acknowledge and provides support for the examiners that the circumferential dimension of the soft seal rings differs than the circumferential dimension the bottom of the first groove.

Appellants' argument that Kilmoyer teaches away from is not persuasive because as stated in the rejection above one would choose to use the teaching of placing soft seal rings on groove of an annular shaped body to provide sealing at low temperatures.

In response to applicant's argument that the backup ring must be compressed to be inserted into an annular gap, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. Furthermore the back up ring of McEver is capable of being placed in a gap that is smaller than the radial dimension of the annular shaped body.

Response to arguments for 5th ground of rejection, claims 23-25 rejected as 103(a) by McEver, Kilmoyer and Vanderford Jr.:

Appellants' argument that since claim 19 is not taught by McEver and Kilmoyer and no further limitations are taught by Vanderford Jr. for claim 19, the claim 23 should be allowed is not persuasive because as stated in the rejection above the claim 19 is rejected by McEver and Kilmoyer and the arguments immediately above further support the rejection. Furthermore, the reference of Vanderford Jr. teaches to have a bend between opposed ends of the backup ring.

Response to arguments for claims 24 and 25:

Appellants' argument that since claim 19 is not taught by McEver and Kilmoyer, the claims 24-25 should be allowed is not persuasive because as stated in the rejection above the claim 19 is rejected by McEver and Kilmoyer and the arguments immediately above further support the rejection.

In response to applicant's argument that when placed in contact with one of the first and second bodies deforms the first groove to force the ends of the backup ring away from each other, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. This functional recitation is accomplished by having a bend between the opposed ends of the backup ring (See specification page 3, lines 20-23, "The ring 12 has a bend 22 that absorbs and stores a force as ends 16 and 18 are pushed into the interference fit of the annular space in which they are mounted. As a result, the ring 12 acts as a spring due to placement of bend 22.") and this structural limitations is taught by Vanderford Jr.

Response to arguments for 6th ground of rejection, claim 28 rejected as 103(a) by McEver, Kilmoyer, Vanderford Jr. and Taylor:

In short McEver teaches to have an annular shaped body with backup rings at opposed ends of the annular shaped body, Kilmoyer teaches to have grooves on annular shaped body and soft seal rings in the grooves to provide low temperature sealing (column 3, lines 10-21 of Kilmoyer), Vanderford Jr. teaches to have an inflected portion (e.g. bend) between opposed ends of the backup rings to provide strength to the backup ring (column 3, lines 65-68 of Vanderford Jr.) and finally Taylor teaches that backup rings are well know to have straight opposed ends (figure 5 of Taylor) or looped opposed ends (figure 4 of Taylor), so to have looped opposed ends or straight opposed ends is considered to be art equivalent.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Vishal Patel/

Primary Examiner, Art Unit 3676

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